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OF PLANT PROTECTION

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DISCOVERIES AND CURRENT EVENTS *

French North Africa : Swarms and Laying of *Schistocerca gregaria* (1).

ALGERIA.

2 March 1932 — Swarm at Guerrara (Ghardaïa).
4 » » — A large swarm of red locusts passed over Beni-Ounif flying from N. to S.
» » » — A somewhat dense swarm of brown locusts passed flying N. to S. between Colomb-Béchar and Kenadza.
9 » » — Swarm at Guerrara (Ghardaïa).
13 » » — A large swarm coming from the west alighted near Beni-Ounif (Djenan Adrar) and departed on the 14th in an easterly direction.
14 » » — A small swarm of brown locusts alighted near Aïn-Sefra.
» » » — Swarm of 1 × 0.5 km coming from the south alighted 35 km east of Brézina (Géryville).
17 » » — A sparse swarm alighted 12 km west of Brézina (Géryville).
21 » » — A large swarm coming from the east alighted 1 km from Frendi (Beni-Ounif).
22 » » — Ghardaïa reported a swarm in the Oued Madagh el Kebir.
23 » » — A small swarm of red locusts passed near Aïn-Sefra flying from west to east.
23 » » — Taghit reported a large swarm on the ground 30 km north of the post.
» » » — Meridja reported copulating locusts 20 km S. W. of the post.
» » » — Small swarm 30 km S. W. of Messad flying N. W.
24 » » — Ghardaïa reported a swarm 8 km north of the post.
30 » » — Tébessa reported large swarms coming from the south laying in the region of Bir bou Habeline.
» » » — Small swarm on the ground at Oued Dermel (Ain-Sefra).
31 » » — El Oued reported swarms and laying along the El Oued Nefta.

TUNIS.

1 March 1932 — Dark red swarm flying from S. W. to N. E. at Bordj Lebœuf.
» » » — Dark red swarm 40 km S. E. of Kebili.

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* In this, as in the third chapter, the countries are arranged in French alphabetical order.

(1) Communication from the General Government of Algeria to the International Institute of Agriculture.

2 March 1932 — Swarms flying from S. to N. at 20 km. and 70 km. S. of Takahouine.
4 » » — Large swarm 30 km in breadth 35 km S. W. of Médenine.
» » » — A swarm of 1 sq. km alighted 30 km W. S. W. of Matmata.
10 » » — Swarm 43 km W. S. W. of Tozeur.
11 » » — Further locusts coming from the S. W. and W. swelled the swarms remaining west of Tatahouine and laid.
12 » » — The swarm reported 30 km W. S. W. of Matmata laying.
14 » » — A large swarm 5 km. in length alighted 30 km. S. E. of Matmata.
» » » — Three swarms, two of which were small, were reported near Médenine ; copulation occurred.
15 » » — The swarm reported on 10 March 43 km W. S. W. of Tozeur laying.
» » » — Swarms scattered about the region west of the post of Matmata. Copulation occurred.
16 » » — A large swarm coming from the west alighted 2 km from Kebili.
17 » » — A large swarm alighted in the region of Matmata.
» » » — Swarms reported 42 km S. W. of Kebili towards the Algerian frontier.
18 » » — Laying observed 2 km south of Matmata.
» » » — A swarm alighted 15 km east of Matmata.
19 » » — A swarm alighted 70 km S. W. of Gabès. Copulation. Some laying.
» » » — A small swarm alighted 60 km S. S. E. of Ben Gardane.
20 » » — Extensive laying 30 km S. E. of Matmata. Swarm 30 km. west of Médenine.
21 » » — A swarm of 3 × 1 km. coming from the west alighted 50 km S. W. of Gabès.
» » » — Laying observed 65 km west of Gabès.
» » » — A swarm passed 35 km west of Gabès flying from E. to W.
» » » — A swarm alighted 65 km S. E. of Ben Gardane and departed towards the east.
22 » » — A small swarm alighted 15 km S. W. of Ben Gardane and was destroyed.
23 » » — A swarm of medium size coming from the S. W. alighted 43 km S. S. E. of Gabès.
» » » — A swarm coming from the S. W. alighted 22 km S. W. of Ben Gardane.
24 » » — Laying 15 km S. W. of the post of Ben Gardane.
25 » » — A small swarm coming from the S. W. alighted 25 km N. W. of Gabès and was destroyed.
» » » — Laying occurred from 20 March 60 km east of Gabès.
26 » » — A swarm coming from the west alighted 23 km W. S. W. of Ben Gardane.
» » » — Laying reported 65 km S. of Ben Gardane.
27 » » — A swarm coming from the N. E. on the ground 32 km S. of Ben Gardane.
28 » » — A swarm coming from the south alighted 30 km N. E. of Kebili.

28 March 1932 — A swarm alighted 40 km south of Gabès.
» » » — A swarm coming from N. W. alighted 25 km N. W. of Tozeur.
» » » — Laying reported 30 km N. E. of Kebili.
» » » — Laying 20-30 km. south of Ben Gardane.
30 » » — A swarm coming from N. W. alighted 20 km east of Médenine.

MOROCCO.

3 March 1932 — A swarm from the S. E. alighted 54 km E. N. E. of Bou Denib.
» » — A swarm alighted at Tamanar (Mogador).
» » » — A small swarm alighted 24 km E. of Dar Ould Zidouh (South Chaouïa).
7 » » — A very dense swarm of 14 × 6 km alighted near Mogador.
» » » — Two swarms reported 32 km and 26 km E. of Mogador.
» » » — A swarm of 4 km departed from the vicinity of Demnat (Marrakech) towards the N. N. E.
» » » — A swarm alighted 18 km S. E. of Dar Ould Zidouh (South Chaouïa).
» » » — A small swarm alighted 14 km W. of Beni Mellal.
» » » — A swarm alighted 18 km E. S. E. of Boujad.
» » » — A dense swarm stopped 23 km N. of Demnat.
» » » — Part of a large swarm from the south alighted 16 km N. E. of Mogador.
» » » — A medium-sized swarm 24 km S. E. of Mogador.
8 » » — A large swarm passed 22 km west of Sidi-Slimane.
» » » — A swarm 23 km N. of Demnat departed in a westerly direction.
» » » — Three swarms alighted 26, 30 and 32 km E. and S. E. of El Kelan (Marrakech).
9 » » — Two swarms alighted 15 km N. E. of Demnat (Marrakech).
» » » — Several small swarms 28 km and 9 km S. W. of Tamanar (Mogador).
» » » — Two swarms alighted 12 and 30 km E. of Dar Ould Zidough (Tadla).
10 » » — Swarms from the region of Gharb departed towards the north 12 km N. N. E. of Sidi Yahia.
» » » — Laying 7 km S. W. of Sidi Slimane.
12 » » — A swarm of 4 × 2 km coming from the Sous alighted 30 km S. W. of Argana and departed on the 13th in southerly and north-westerly directions.
13 » » — Swarms in the region of Azilal departed towards the N. E.
» » » — Laying 25 km S. S. W. of Dar Ouled Zidouh.
» » » — A yellow swarm laying 14 km S. E. of Dar Ouled Zidouh.
» » » — Swarm 8 km N. E. of Kasbah-Tadla.
14 » » — Swarm 18 km E. N. E. of Kasbah-Tadla.
» » » — Copulating locusts over 1000 ha. to the west of Sidi Himane.
15 » » — A swarm of 21 sq. km. alighted 11 km E. of Kasbah-Tadla.
16 » » — A swarm of 5 sq. km. alighted 26 km W. S. W. of Petit Jean.
17 » » — Laying 16 km N. E. and 24 km S. E. of Mogador.
» » » — Laying over 4 sq. km at 40 km W. N. W. of Petit Jean.
» » » — Laying 9 km E. S. S. and 12 km E. of Mogador.
» » » — A swarm alighted 10 km S. W. of El Kelaa.

18 March 1932 — A swarm of 8 × 15 km alighted 6 km S. E. of Safi and departed towards the S. W.
» » » — A swarm alighted 56 km N. E. of Taroudant.
19 » » — Two swarms flew east of Boujad and Tadla.
21 » » — A fair-sized swarm passed over Petit Jean going west.
» » » — A somewhat dense swarm came to ground 26 km N. W. of Azizal.
» » » — A red swarm of 5 × 2 km coming from N. W. alighted 20 km E. of Kasbah-Tadla.
» » » — A swarm of 10 sq. km alighted 9 km E. S. E. of Petit Jean flew 22 km to the S. W. Copulation.
» » » — A swarm alighted 25 km S. E. of Kelaa.
» » » — Laying over 800 ha 100 km E. of Agadir.
22 » » — Laying 25 km S. E. of Kelaa.
» » » — A swarm 10 km E. S. E. of El Kelaa.
» » » — Laying over 10 ha. 10 km S. E. of Sidi Slimane.
» » » — Laying over 300 ha. 29 km E. S. E. of Mogador.
» » » — A swarm of 2 × 2 km alighted 16 km S. S. E. of Kasbah Tadla ; departed on the 23rd towards the N. E.
» » » — Laying over 10 ha. 3 km S., over 10 ha. 17 km, over 5 ha. 16 km S. S. E. of Biougra (Sous).
23 » » — The swarm reported on the 19th at 11 km E. of Tadla departed towards the S. W.
» » » — A swarm covering 100 ha alighted 16 km from Beni Mellal.
» » » — A swarm 28 km S. of Safi departed on the 24th towards the N. E.
» » » — Laying at 12 km N. E., 16 km N. N. E. and 20 km N. of Tadla.
» » » — Laying over 2000 ha. 20 km N. W. of Taroudant ; 200 ha 40 km E. S. E. of Agadir.
» » » — Laying over 2 sq. km at 6 km and 1 km S. W. of Petit Jean.
» » » — Swarms at 24 and 34 km N. E. of Taroudant flying west.
» » » — Laying over 1 sq. km at 5 km E. of Petit Jean.
» » » — Laying at 13 km S. W. of Sidi Slimane.
» » » — Swarm of 5 × 2 km at 30 km N. E. of Imouzar.
» » » — Swarm of 7 × 3 km at 20 km N. of Tamanar.
24 » » — Two dense swarms near Taroudant.
» » » — Laying over 300 ha 10 km W. of Tamanar ; over 10 ha 27 km S. S. W. of Tamanar.
» » » — Two swarms of 5 × 2 km and 3 × 2 km alighted 16 km and 25 km N. W. of Demnat.
» » » — Two swarms at 5 and 15 km N. E. and E. of Petit Jean.
» » » — A swarm 20 km N. of Tamanar departed towards the N. E.
» » » — A small swarm alighted 16 km N. E. of Demnat.
» » » — Laying over 450 ha. 12 km E. of Mogador ; over 200 ha 42 km S. of Safi.
25 » » — A swarm of 3 × 2 km coming from the north alighted 38 km S. E. of El Kelaa, then flew N.
» » » — A small swarm alighted 17 km N. W. of Demnat. Copulation.
» » » — A swarm alighted 20 km N. of Demnat.
» » » — Laying over 200 ha 28 km E. of Taroudant ; over 500 ha. 15 km E. of Tadla ; over 1000 ha in the farms around Petit Jean.

26 March 1932 — Swarms from the vicinity of Demnat departed towards the west and alighted 16 km W. of Demnat.
» » » — A swarm of 4 sq. km alighted 17 km S. E. of Tadla and departed towards the N. E.
» » » — Laying over 1000 ha. 17 km N. E. of Taroudant ; over 3 ha 54 km S. E. of Safi ; at 16 km N. W. and 25 km N. W. of Demnat.
27 » » — A swarm of 4 sq. km alighted 50 km S. of Safi.
» » » — A swarm of 3 × 3 km alighted 20 km S. E. of Tadla.
» » » — A swarm of 5 sq. km alighted 20 km S. of Tadla.
28 » » — Swarms 40 km S. E. of Mogador.
» » » — A medium swarm passed 25 km S. E. of El Kelaa flying east.
» » » — Locusts on the ground 30 km E. of Dar Ouled Zidouh.
» » » — Swarms from 12 km S. E. of Petit Jean alighted 34 km E. N. E. of Petit Jean.
29 » » — Laying over 5000 ha 30 km N. E. and over 20 ha 38 km N. E. of Taroudant.

Eritrea : Desert and Tropical Migratory Locusts *(Schistocerca gregaria* and *Locusta migratorioides)* (1).

During February 1932 there have been no reports of laying or hatching of eggs. No locust swarms have passed over the Colony.

All along the Red Sea Coast, particularly at the entry of streams, small groups of *Schistocerca gregaria* and *Locusta migratorioides* belonging to the solitary phase have been reported.

During March 1932 no swarms, laying or hoppers were reported in the Colony.

United States of America : Some Diseases of Small Fruits (2).

In several localities of the Atlantic Coast diseases of small fruits were more serious during 1931 than other recent years.

Dr. A. N. Brooks reported from Florida that an average of only 50 per cent. of the strawberries picked this season in the Hillsborough and Polk County sections had been packed out for shipping. The highest percentage was about 70 per cent. and following heavy rains, only 20 to 25 per cent. were packed out. He attributed 90 per cent. of the trouble directly or indirectly to cold weather and excessive rainfall.

There was widespread lack of pollination which resulted in deformed berries. Examination of blossoms disclosed lack of pollen in many, and in others the pollen was not released. Another effect of cold weather was a lengthening of the period between blossoming and ripening of fruit from the normal three or four weeks to five or six weeks, while fruit buds continued to push out at about the usual rate. This resulted in an abundance of potential fruit on the plants, a single plant often carrying from 100 to 200 green berries. The fruit from such plants was of small size.

(1) Communication from the official correspondent of the Institute, Dr. A. De Benedictis, Chief of the Agricultural Bureau of Eritrea, transmitted by the Government of the Colony.

(2) Communication from the official correspondent of the Institute, Dr. Neil E. Stevens, Senior Pathologist, Plant Disease Survey, Bureau of Plant Industry, United States Department of Agriculture, Washington.

Dr. R. F. Poole reported that in 1926, 1927, 1928 and 1929, anthracnose of dewberries was of minor importance in the Sandhill region of North Carolina. In 1930 there was a minor infection of the berries, but a definite increase in infection of leaf and cane on Lucretia dewberries. During 1931 the disease was of major importance. A very large portion of the crop was destroyed or became unprofitable. As far as can be judged from their reports, the condition in 1931 corresponds closely with that noted by Wolf and Dodge in 1925.

The Massachusetts cranberry crop, which comprises about three-fourths of the cranberry crop of the United States, showed an unusual loss from rot in 1931. The keeping quality was undoubtedly poorer than that of 1922, and in the opinion of some observers, was inferior to the notorious crop of 1914. An idea of the relative amount of loss from decay during recent years may be gained from a comparison of the average amount of decay in storage lots from representative bogs in Plymouth County during the last four years as shown in Table I. The figures given are for the condition on Novvember 15 when the fruit had been in storage approximately two months. Similar differences appeared on October 15.

The Early Black is the most important variety, and makes up approximately half the total production. The Howes is second in importance and is the standard late variety. Eight to ten lots were stored for each variety.

Table I. — Average condition of test storage lots of cranberries expressed as percentage of rotten berries, November 15.

Variety	Percentage Rotten November 15			
	1928	1929	1930	1931
Early Black	7.4	11	13.1	31
Howes	6.5	9	6.7	14
Odd varieties	12.2	18	15.6	30.5

The condition of the crop is apparently correlated with unusually high temperatures in May and June combined with an unusual number of rainy days in July and August. This combination of weather conditions has occurred only four times in the last twenty years, in 1914, 1919, 1922, and 1931, all years in which the crop showed poor keeping quality.

VARIOUS QUESTIONS

Discussions of the Committee for the Study of Locust Biology at Algiers (1).

The Committee for the Study of Locust Biology (C. E. B. A.), which was established by the VIIth North African Conference, met at Algiers, January 21-23, 1932. The principal discussions are reported as follows :—

(1) Communication to the International Institute of Agriculture from the Government General of Algeria (Direction des Services Economiques).

Executive organisations attached to the C. E. B. A. — The Delegates agreed to appoint as executive bodies (Inter-Centres) the Crop Protection Services or, where such do not exist, the Government Departments specially concerned. The Regional Station of Algiers was in accordance with the provisions of the Rome International Convention of 31 October, 1920 adopted as Permanent Centre.

It is understood that any organisation which has carried out research on locust biology may on request become a corresponding body under the C. E. B. A.

Functions assigned to the executive bodies of the C. E. B. A. — The Inter-Centres shall communicate to Algiers the information they receive. The Permanent Centre in Algiers will undertake to distribute the communications, in the full text if required, to bodies interested and in particular to the Ministry of Colonies in Paris, the Sheriffian Scientific Institute, the International Centre for Locust Biology and to the International Institute of Agriculture at Rome, to this last being obligatory in virtue of the Rome Convention of 31 October 1920.

The Committee expressed a wish that the International Institute of Agriculture should undertake the entire distribution of the documents.

International Centre for the Study of Locust Biology. — Resolutions 2 and 6 of the International Meeting held at Rome, September 28 to October 1, 1931 on the initiative of the British and Italian Governments, [see this *Bulletin*, 1932, No. 1, p. 8] were read.

All the Delegates were agreed in recognising that the Imperial Institute of Entomology in London should be chosen as the International Centre for the Study of Locust Biology.

Relations with the International Centre for the Study of Locust Biology. — The Committee passed the following resolution :—

' The C. E. B. A. expresses the wish :—

(1) That the International Centre in London shall agree to keep the Committee informed of the results of its activities ;

(2) That the International Centre in London shall publish annually and forward to the Committee a bibliographical analysis of all that has been published on locust questions, including both biology and control '.

Uniform action of the countries represented. — The following passage was read from the report presented by the Director of the Economic Services of the Government General of Algeria :— ' The major migratory species of locusts *must show certain biological resemblances and complete knowledge of the life cycle of one may greatly facilitate study of the others* ; also seeing that their geographical area of distribution overlaps, the work of a research party in a given place will be of general interest whatever was the principal point of study. All research and survey work must thus be undertaken jointly by all the States represented on the C. E. B. A., *even if any one of them has nothing to fear from some particular species* '.

The Committee is of the opinion that it is necessary that action should be on uniform lines and the representatives of each country of French Africa are prepared to work on this principle.

Participation of countries not represented on the C. E. B. A. — The Committee considers that Togoland and the Cameroons should be asked to send representatives in an advisory capacity to future meetings.

Meteorology. — The Committee is unanimous in affirming the fundamental importance of this question. It is considered indispensable for the prelim-

inary documentation to obtain detailed information on the system of meteorological posts at present existing in the region to be studied and the Committee would prefer to receive the information in the form of maps showing the position of each post and its composition. As regards Algeria, Morocco and Tunis such information may be obtained from the competent Service of each country. For French West Africa and French Equatorial Africa M. Henri Hubert, General Inspector of the Colonial Meteorological Services at the Ministry of Colonies may be asked to supply the information. The Committee would be pleased to receive the reports already completed summarising the meteorology of French Africa and in the future to receive monthly reports such as those established by the Meteorological Service of Algiers. The Director of the Economic Services of the Government General of Algeria may request the Algerian Meteorological Service to supply the material in its possession concerning studies carried out in French Africa. In addition to monthly reports the Committee would be glad to be supplied with more detailed information should occasion arise.

Biological study of the minor migratory locusts.— With reference to the Moroccan locust (*Dociostaurus maroccanus*) the Committee is of the opinion that it would be of considerable importance to ascertain whether in the zones where the species is endemic in Algeria and Morocco the phenomenon of the phases suspected in the East may also be found. Such a study might be a useful contribution to that of the major migratory locusts. The Committee considers on the other hand that it would be useless to carry out a similar study of the Italian locust (*Calliptamus italicus*), its zone of endemic occurrence being very limited in North Africa.

General scheme of enquiry.

(*a*) Necessity for a single enquiry. — The following passage from the report quoted above was read :— ' It is essential to avoid the dispersion of information which seems to have brought to nothing the separate efforts of the bodies which have undertaken locust research. With this purpose a resolution must be formulated requesting the ' Commission Nationale d'Etude des Calamités ', which has already asked for assistance in the Colonies now linked up on the C. E. B. A., to rely on this organisation which would then alone carry on the investigations '.

After discussing the question the Committee decided that by ' single enquiry ' should be understood that carried out by a single authority, by a single organisation issuing instructions to official or voluntary observers and receiving from them the information collected.

As regards French Africa the Committee understands that it itself constitutes this authority. It will carry out the single enquiry and the Crop Protection Service at Algiers will be its executive body. The Committee further recognises :—

(1) ' That it is understood that the interchange of information already being effected between countries in accordance with the Rome Convention of 1920 shall be continued as in the past ;

(2) That if certain organisations such as the Ministry of Colonies and ' Commission des Calamités ', desire to receive information the Committee shall supply them with its documentation '.

(*b*) Previous invasions. — The study of the beginning of the invasion making it possible to locate the permanent breeding zones of the migratory species the Committee recommends :—

' (1) That Governments having collected information on previous invasions should provide for an enquiry of this order covering the years up to 1927 inclusive which will be of value for the future work of the Committee ;

(2) That the Crop Protection Service at Algiers shall undertake this enquiry and prepare invasion maps which will make it possible to illustrate the matter received '.

(c) Questionnaire. — The following questionnaire was drawn up as a result of the discussions :—

QUESTIONNAIRE

I. — Observations on the passage of migratory swarms.

(1) Locality.
(2) Distance and direction in relation to a fixed point on a map (scale 1: 2 000 000)
(3) Geographical position (latitude and longitude).
(4) Date and hour.
(5) Direction of flight.
(6) Predominant colour of locusts : pink, red, yellow or brown.
(7) Weather conditions :
Predominant wind.
Temperature.
Effects of sudden changes of weather on the locusts (rain, storm, fall in temperature, etc.).
(8) Conditions coincident with the settling of the swarm (hour, change of weather, attraction by crops, etc.).
(9) What plants, wild or cultivated, have been attacked and which avoided by the locusts.

II. — Observations on laying (primary swarms).

(1) Locality.
(2) Date.
(3) Direction from which locusts arrived (primary swarm).
(4) Weather conditions (particularly rainfall during the days (about a week) preceding the beginning of laying.
(5) Description of breeding grounds :
(a) Position (slopes, valleys, banks of waterways, etc.).
(b) Quality of soil chosen (texture and moisture content).
(c) Nature of vegetation.

III. — Observations on eggs and hatching.

(1) Situation and extent of land on which eggs are found.
(2) (a) Date of first laying.
(b) Date of hatching of first hoppers.
(c) Date of hatching of last hoppers.
(3) Weather conditions (specially rain) from laying till end of hatching (changes of weather such as sudden rains, rise or fall of temperature, etc., should be noted).

IV. — Observations on hoppers.

(1) Locality and date of observations.
(2) Date of hatching of first hoppers.
(3) What plants are eaten by hoppers, what plants are avoided (differences on this point may exist among hoppers at different ages).
(4) Are there present hoppers of abnormal colouring, particularly green or brown ? If so, in what approximate proportion to those of normal colouring (black and yellow).

V. — Observations on adults hatched locally (secondary swarm).

(1) Locality and date of observations.
(2) Notes, if required, on primary swarm in cases where there is no doubt on the parentage of the secondary swarm observed.
(3) Dates on which all the individuals of the new swarm show wings and become yellow.
(4) Date on which the locusts begin to fly.
(5) Date and direction of departure of new swarm.
(6) Plants eaten by secondary swarm.

VI. — Miscellaneous information.

Collect native sayings, customs, superstitions, etc., concerning locusts in all stages of development. Native names should be noted, whether of locusts in general or particular species.

(*d*) Correspondents. — Apart from the official ocorrespondents to which the Governments on request of the Committee will give precise directions, the Committee will address questionnaires to the following voluntary correspondents :— estate managers, teachers, missionaries, who will be provided with printed addressed envelopes to be posted free of charge.

(*e*) Maps. — Although the international map of Africa on a scale of 1 : 2 000 000 is inadequate for recording the number of indications obtained during a carefully observed invasion, the Committee considers that it will suffice for documentation purposes.

(*f*) Conventional signs. — The Committee adopts those decided on by the International Meeting at Rome, 28 September-1 October 1931 [see this *Bulletin*, 1932, No. 1, p. 10).

(*g*) Specimens. — The Committee considers the forwarding of specimens of special importance. It was decided that specimens of adult locusts may be killed by immercsion in very hot water, quickly dried, enclosed in paper envelopes or put in cardboard tubes closed with wadding and sent as rapidly as possible in suitable packages. Eggs and young hoppers however should be sent only in pure or denatured alcohol. In each case the colour of the living animal should be noted previously. The Committee considers that to facilitate the work of the senders they should be provided with suitable means of packing.

Each sample should be accompanied by labels inside and outside indicating (*a*) locality, (*b*) time of capture, (*c*) the reference number borne elsewhere on the correspondence, the questionnaire or other report concerning the specimen. The Committee requires that the samples shall be addressed direct to the Centre at Algiers by the collectors and that free postage shall be granted throughout French Africa, authorised by a special label. These are the only indications absolutely essential.

Meetings of the C. E. B. A — In accordance with the suggestions of the Government General of Algeria, adopted by the VIIth North African Conference, the C. E. B. A. shall meet as often as the successful progress of its work requires and at least once each year, before the sessions of the North African Conference.

The Committee decides to meet before the International Meeting for Locust Control that is to be held in Paris in July 1932 on the occasion of the Vth International Entomological Congress, in order to report on its work to the Delegates of the various Governments.

Publications of the C. B. E. A. — The Committee will publish reports of its meetings, its recommendations to the Governments and the reports that it receives from the research parties.

Research parties. — The Committee is of opinion that for the following reasons there is need to send a party this year, in October for example, into the regions about Ségou, San and Timbuktu :—

(1) The Central Locust Committee has just sent a party into Nigeria. It also proposes to send a party to the region specified if the French Government does not accept the offer of collaboration formulated in the 7th Resolution of the International Meeting in Rome [see this *Bulletin*, 1932, No. 1, p. 8].

(2) The region indicated may, according to information already collected, be regarded as definitely possessing the two migratory species which are most

important for French Africa, the tropical migratory locust (*Locusta migratorioides*) and the desert locust (*Schistocerca gregaria*) ;

(3) Specimens sent to the experts include transitional forms which indicate that this region is important for the study of the phases ;

(4) The date of departure may be quickly arranged as there is complete security and means of transport are fully assured in the regions concerned.

The Committee considers that the British Government should be requested to appoint an English entomologist to accompany the French expedition.

The Committee in view of the various difficulties in the way of survey work in Spanish Rio de Oro, which however is of primary importance for the study of the invasions of Morocco and Western Algeria by the desert locust, desires to call the attention of the Governments to these matters.

As regards the sending of parties into Mauritania and Oubanghi-Chari-Tchad, which were under consideration at the VIIth North African Conference, the Committee is of opinion that a report on the question should be made at the next meeting.

Staff of the Permanent Centre of the C. E. B. A. — In consideration of the very considerable work involved in the collection and examination of documents by the Crop Protection Service of Algiers the Committee is of opinion that the extra expenditure on the necessary specialised staff and equipment should be charged on the total credit of 1 500 000 francs agreed to by the last North African Conference.

General motion. — The Committee being aware of the difficulties of all sorts involved in the biological study of locusts, difficulties relating to the long distances, the enormous extent of the zones for survey, the scarcity of meteorological and pedological documentation in the zones, and more particularly to the very difficult nature of the biological problem itself, desires to call the attention of the higher authority to the necessity of prolonging the studies and to their probable long duration. It is desirable that the Government, public opinion and its chosen representatives and the press should be informed on this point and should refrain from any undue desire for speed such as might tend to discredit or discountenance this international enquiry.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Cuba. — In virtue of the ' resolución ' of 12 December 1931 exporters of fresh plant produce must apply to the ' Sección de Sanidad Vegetal ', at least 24 hours in advance of the time arranged for packing, for the visit of an inspector who must examine the produce and will authorise shipment only of that which complies with the prescribed sanitary conditions and is of commercial value. To his request for inspection every exporter must attach the receipt for the sum paid to the ' Pagaduría de la Secretaría de Agricultura, Comercio y Trabajo ' in payment of the charge for inspection in the given hours of working and non-working days based on the tariff contained in the present ' resolución '. (*Revista de Agricultura, Comercio y Trabajo*, Órgano Oficial, Habana, Cuba, 1932, año XIII, núm. 7, pág. 49).

Spain. — By Decree of 18 February 1932 exportation of potatoes is authorised by all the customs offices of the Republic provided that they comply with the following conditions :—

Potatoes intended for exportation shall be free from all kinds of insects, insect larvae and eggs, also from any cryptogamic disease regarded as harmful to the crops of the importing country.

The customs offices will authorise exportation of consignments only when these are accompanied by a certificate issued by the Inspection Service of the respective Agronomic Sections. (*Gaceta de Madrid*, Madrid, 19 febrero 1932, año CCLXXI, tomo I, núm. 50, págs. 1228 á 1230).

France. — By Ministerial Decree of 8 April 1932 the prohibition contained in article 1 of the Decree of 8 March 1932 [see this *Bulletin*, 1932, No. 4, p. 57] relating to measures for preventing the introduction into France of the San José scale (*Aspidiotus perniciosus*) is applicable to consignments coming from Argentina, South Africa, the Hawaiian Islands and Mexico.

Article 4 of the Decree of 15 March 1932 [see this *Bulletin*, 1932, No. 4, p. 58] relating to temporary measures is cancelled. (*Journal Officiel de la République Française*, Paris, 13 avril 1932, LXIV^{ème} année, n^{o} 87, p. 3984).

*** By Decree of 18 April 1932 from the date which will be fixed by the Minister of Agriculture, the importation and transit of potatoes, tomatoes, aubergines, living plants, tubers, rhizomes, bulbs of all sorts and fresh vegetables are forbidden in France if coming from Great Britain, Germany or the Netherlands.

Importation into France of potatoes coming from Spain is forbidden in the same conditions. As an exception to this importation of seed potatoes coming from the above-named countries may be authorised by Decree of the Minister of Agriculture. (*Ministère de l'Agriculture. Direction de l'Agriculture. Bulletin de l'Office de Renseignements Agricoles*, Paris, 1er mai 1932, année 1932, n^{o} 9, p. 193).

*** By Ministerial Decree of 18 April 1932 the provisions of the Decree of 18 April 1932 came into force as from the day of publication in the *Journal Officiel* (20 April 1932). (*Ibid.*, p. 196).

*** By Ministerial Decree of 18 April 1932 the exceptional importation of seed potatoes allowed by the Decree of 18 April 1932 may be effected without previous authorisation when the potatoes are accompanied by a certificate conforming to the model annexed to the present Ministerial Decree and issued by the official authorities of the country of origin and provenance of the potatoes, stating that the latter are selected seed, *i. e.*, that they were grown and harvested in accordance with normal genetical procedure under the control of skilled geneticists. The certificate must also state that the consignments are free from diseases and parasites. (*Ibid.*, p. 196-197).

Italy. — By Law No. 185 of 8 February 1932, the Royal Decree-Law No. 799 of 12 June 1931 (see this *Bulletin*, 1931, No. 9, p. 166) concerning the reduction of the trade tax on fertiliser and anti-cryptogamic materials directly utilisable in agriculture to 0.50 liras per cent, has been made law. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 23 marzo 1932, anno 73°, n. 68, p. 1371).

*** The Royal Decree Law No. 242 of 19 March 1932 gives full and entire effect to the commercial 'Modus vivendi' between Italy and France signed at Rome on 4 March 1932.

In accordance with Art. 6 of this Agreement the High Contracting Parties reserve in all circumstances the right to prohibit or restrict importation and exportation of merchandise for reasons of sanitary policy in order to ensure the protection of man, animals or plants against diseases or parasites, all provision to this effect being equally applicable to any other countries in similar conditions. This Agreement came into force on 4 April 1932. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 2 aprile 1932, anno 73°, n. 77, pp. 1567-1588 ; 4 aprile 1932, n. 78, p. 1618).

*** With a view to avoiding any hindrance or delay in the foreign exportation of Italian potatoes, by Circular No. 235 of 12 March 1932 the Ministry of Agriculture and Forests communicated to the Directors of the Royal Phytopathological Observatories the regulations now in force in European countries (Germany, Czechoslovakia, Yugoslavia, Austria, Denmark, England, Belgium, Sweden, Norway, Luxemburg, France and Switzerland) regarding importation into their respective territories of Italian potatoes. (*Bollettino Ufficiale del Ministero dell'Agricoltura e delle Foreste*, Roma, 1° aprile 1932, anno IV, n. 7, pp. 903-908).

Mexico. — On 21 December 1931 was instituted the ' Cuarentena Interior Núm. 6 ' with the purpose of preventing the spread of the disease of bananas caused by *Fusarium cubense* and commonly known as ' mal de Panamá ' (Panama disease) and as ' mancha del plátano' in certain parts of the Republic.

All the banana growing regions of the country are declared ' zonas de control '. There are at present 14 of these zones, each with precise boundaries. Three are subjected to total quarantine, the percentage of the disease being over 30 % ; three are in partial quarantine, the amount of disease being less than 10 % ; in the remaining eight which are declared free from infection the necessary precautions will be taken to avoid introducing the disease.

Any owner or holder of any banana plantation whatever within the zones of control must immediately inform the ' Oficina Federal para la Defensa Agrícola ' or its representatives of the presence of the disease and put into force the special regulations ordered in each case by the ' Oficina ' in order to prevent the disease spreading.

A series of measures regulates transport of any part of the banana plant, with the exception of the fruit, within and from the zones of control subjected to total or partial quarantine.

A permit from the ' Oficina ' is required before planting bananas in any region of the Republic. Any new plantation must be made with ' semilla ' coming from a non-infected zone and whose origin is certified by the ' Oficina ' or its representatives. In the zones subjected to total quarantine banana plantations may be planted only with varieties known to be resistant to or immune from the disease.

By the end of five years plantations of varieties considered susceptible to Panama disease must be eradicated from the zones in total quarantine.

In all the zones of control already defined and any which may later be formed will be instituted a Committee which will be responsible for superintending the control campaign against Panama disease in close collaboration with the ' Oficina '.

Violation of the regulations is punishable under various legislative provisions. (*Diario Oficial*, México, 13 de enero de 1932, tomo LXX, núm. 10, págs. 3 a 5).

New Zealand. — By special order, made by the Otahuhu Borough Council on 19 November 1931 and published by the Minister of Agriculture on 16 December 1931, the following plants are declared to be noxious weeds within the jurisdiction

of the Otahuhu Borough Council :— *Lycium horridum, Berberis vulgaris, Cryptostemma calendulaceum, Melianthus major, Psoralea pinnata, Galega officinalis, Rubus phoenicolasius, Lantana Camara, Echium plantagineum, Thlaspi arvense, Opuntia* (any species), *Leycesteria formosa, Linaria vulgaris, Solanum auriculatum, Anthemis Cotula, Convolvulus arvensis* and *C. sepium*. (*The New Zealand Gazette*, Wellington, December 24, 1931, Numb. 96, p. 3593).

Peru. — By ' resolución ' of 19 November 1931 the sugar cane plantations of the valleys of the Rimac and Carabayllo have been declared infested by *Metamasius hemipterus* ; consequently the removal of cane cuttings from these valleys, intended either for planting or consumption in other valleys of the Republic or for the general market, is forbidden. (*La Vida Agrícola*, Lima, 1932, vol. IX, no. 98, pág. 50).

Portugal. — The Decree No. 20535 of 6 November 1931 gives new regulations concerning importation of potatoes.

It is forbidden to import potatoes from countries having no well-organised Phytosanitary Service, also to import potatoes from America. Each consignment of potatoes intended for importation shall be accompanied by a certificate issued by the official Phytosanitary Service of the exporting country stating that wart disease (*Synchytrium endobioticum*) and Colorado beetle (*Leptinotarsa decemlineata*) do not occur in the country of origin either at the place or within 5 and 50 km respectively of the place where the potatoes were grown. The importer must inform the headquarters of the Phytosanitary Service six days in advance of any consignment of potatoes intended for importation, indicating the quantity, place of origin and place of entry.

The official responsible for inspection must open and verify at least 5 % of the bags or boxes. The least presence of wart disease will prevent importation. Consignments which shall contain more than 5 % of potatoes infected with *Phytophthora infestans, Spongospora subterranea, Actinomyces Scabies*, with other fungi or bacteria, with *Phthorimaea operculella*, or which are injured or damaged by frost will not be admitted for importation. Consignments which shall contain the least trace of wart disease or of the Colorado beetle, or whose certificates do not fulfil the requirements will be thrown overboard or burnt or, on request of and at the expense of the importer, will be returned to the consigner.

Whenever the official responsible for inspection shall refuse to import a consignment he must report the fact to the headquarters of the Phytosanitary Service, which, if it is considered advisable, will bring the matter to the attention of the Phytosanitary Service of the exporting country recommending greater care.

The importer must contribute to State funds 0.01 *escudo* for every kilo of potatoes imported. (*Deutsches Handels-Archiv*, Berlin 1932, 86. Jahrg., S. 171-172).

Sweden. — By Royal Order of 16 October 1931 certain phytosanitary facilities have been accorded for the importation of living plants and plant parts coming from Germany. The conditions are that in each case a certificate shall be presented stating that the exporting firm is subject to constant inspection by the German Phytopathological Service and that such inspection shall not have revealed any plant disease or pest whose presence would in accordance with Swedish law prevent importation. If the plants or plant parts come from fields, nurseries or pots containing heath or peat soil importation will be allowed if the said certificate gives detailed information regarding the absence of all risk of infection by potato wart disease [*Synchytrium endobioticum*]. (*Deutsches Handels-Archiv*, Berlin 1932, 86. Jahrg., S. 273-274).

Yugoslavia. — By an Order of the Minister of Agriculture which came into force on 24 December 1931 apples and pears will be submitted to phytopathological control on importation even if they are accompanied by a sanitary certificate issued by the exporting country. (*Nachrichtenblatt für den Deutschen Pflanzenschutzdienst*, Berlin 1932, 12. Jahrg., Nr. 2, p. 16).

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[*Schistocerca gregaria, Liogryllus bimaculatus, Sphenoptera patrizii, Earias biplaga, Heliothrips indicus, Aphis gossypii, Zonabris, Dysdercus cardinalis, Oxycarenus hyalinipennis, Nezara viridula* var. *smaragdula*, in Eritrea and Italian Somaliland;

Catontops pinguis, Podagria pallidicolor, Dysdercus nigrofasciatus, in Eritrea; *Scapsipedus marginatus, Schizonycha, Anomala, Opatropsis blairi, Rhytidonota stupida, R. anguicollis, Pycnodactylus mitis, Coptotermes sjöstedti* var. *subintactus, Syagrus rugiceps, Cyrtacanthacris tatarica, Prodenia litura, Cosmophila erosa, Xanthodes graellsi, Spilosoma investigatorum, Sylepta derogata, Acrocercops bifasciata, Pulvinaria jacksoni, Ferrisia virgata, Empoasca facialis, Chloridea obsoleta, Diparopsis castanea, Platyedra gossypiella, Mometa zemiodes, Pyroderces coriacella, Argyroploce leucotreta, Callidea dregei,* in Italian Somaliland].

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[*Poederus sabaeus, Mixis paolii, Carpophilus dimidiatus, Tetralobus cavifrons, Sphenoptera patrizii, Ceroctis rufimembris, Coryna sinuatolineata, C. postmarginata, Opatropsis blairi, Opatrinus* ?, *Rhytidonota anguicollis, R. stupida, Tribolium nivale, Praogena festiva, Syagrus rugiceps, Liniscus* sp., *Pycnodactylus mitis, Neocleonus sannio, Sistates* sp., *Hibosorus illigeri, Schizonycha* sp., *Ischiadon aegyptiacus,* etc.].

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[*Prodenia litura, Chloridea obsoleta, Diparopsis castanea, Tarache nitidula, Earias biplaga, E. insulana, Xanthodes* (*Acontia*) *graellsi, Cosmophila* (*Anomis*) *erosa, Spilosoma investigatorum, Corcyra cephalonica, Sylepta derogata, Argyroploce leucotreta, Platyedra gossypiella, Mometa zemiodes, Acrocercops bifasciata, Pyroderces coriacella*].

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[*Schistocerca gregaria, Cyrtacanthacris tatarica, Liogryllus bimaculatus, Scapsipedus marginatus, Coptotermes sjöstedti* var. *subintactus, Retithrips aegyptiacus, Nezara viridula* var. *smaragdula, Menida decoratula, Euryaspis signoreti, Agonoscelis sansibaricus, Callidea dregei, Anoplocnemis curvipes, Oxycarenus hyalinipennis, Graptostetus servus. Dysdercus cardinalis, Phonoctonus principalis, Triphleps* sp., *Empoasca facialis, Aphis gossypii, Ferrisia virgata, Saissetia nigra, Pulvinaria jacksoni*].

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I. Die wirtschaftliche Bedeutung der Schädlingsbekämpfung. — II. Uebersicht der hauptsächlichsten Erkennungssymptome bei Pflanzenbeschädigungen. — III. Die Bedeutung der Insekten im Haushalt der Natur und insbesondere ihr Nutzen und Schaden. — IV. Die verschiedenen durch Insekten verursachten Beschädigungen an Pflanzen und ihre Auswirkungen. — V. Natürliche Faktoren, welche die Vermehrung der Insekten beeinflussen. — VI. Mortalität bei Insekten, sowie die Bedeutung des Klimas und Nahrungsraumes für die Vermehrung von Insekten. — VII. Die Entstehung der Insektenvermehrungen (Epidemiologie). — VIII. Die verschiedenen Ursachen der Beschädigungen an Pflanzen und Vorräten von Gütern des täglichen Bedarfes. — IX. Die verschiedenen Methoden der Schädlingsbekämpfung. — X. Uebersicht der wichtigsten Schädlinge und ihre Bekämpfung. — XI. Uebersicht über die allerwichtigsten Pflanzenkrankheiten und ihre Bekämpfung. — XII. Der deutsche Pflanzenschutzdienst. — XIII. Rat und Auskunfterteilung in Schädlingsbekämpfungsangelegenheiten. — XIV. Die Abteilung für Schädlingskunde im Frankfurter Zoologischen Garten. — XV. Optische Hilfsmittel. — XVI. [Literatur-Uebersicht].

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